In the claims:

Please substitute the following full listing of claims for the claims as originally filed or most recently amended.

1. (Currently Amended) A central pattern generator-based system for controlling at least one mechanical limb, comprising

at least one mechanical limb; and

a non-biological central pattern generator that autonomously generates commands for controlling the at least one mechanical limb wherein commands are adapted as a function of sensory feedback.

2. (Original) The central pattern generator-based system of claim 1, including a system for phase adjustment of the central pattern generator based on a sensory trigger in or derived from sensory feedback.

3. (Original) The central pattern generator-based system of claim 1, including:

a system for phase adjustment of the central pattern generator based on

at least one sensory trigger in or derived from sensory feedback; and

a system for controlling firing frequency of motoneurons as a function of the sensory feedback or the sensory trigger.

4. (Original) The central pattern generator-based system of claim 1, further including at least one memory device.

5. (Original) The central pattern generator-based system of claim 4, wherein the memory device controls adaptation of output from the central pattern generator.

6. (Original) The central pattern generator-based system of claim 5, wherein the output includes integrate-and-fire neurons.

7. (Original) The central pattern generator-based system of claim 1, wherein the system is at least one chip.

8. (Original) The central pattern generator-based system of claim 7, including at least one chip containing electronic analogues of biological neurons, synapses and time-constraints.

9. (Original) The central pattern generator-based system of claim 7, including at least one chip that includes dynamic memories and phase modulators.

10. (Original) The central pattern generator-based system of claim 1, wherein the system is a non-linear oscillator including electronic analogues of biological neurons, synapses and time-constraints, dynamic memories and phase modulators.

11. (Original) The central pattern generator-based system of claim 7, wherein the system includes at least one chip in which components are integrated with hardwired or programmable circuits.

12. (Original) The central pattern generator-based system of claim 1, wherein the central pattern generator is a distributed system of at least two non-linear oscillators.

13. (Original) The central pattern generator-based system of claim 12, wherein the distributed system includes at least one neuron phasically coupled to a neuron or a sensory input.

14. (Original) The central pattern generator-based system of claim 12, wherein the distributed system includes at least two neurons phasically coupled to each other, to another neuron, or to a sensory input.

15. (Original) The central pattern generator-based system of claim 14, wherein phasic coupling is in-phase, 180 degrees out of phase, or any number of degrees out of phase.

16. (Original)The central pattern generator-based system of claim 14, wherein phasic coupling is based on rhythmic movement application.

17. (Original) The central pattern generator-based system of claim 14, including a phase control circuit.

18. (Original) The central pattern generator-based system of claim 14, including at least one integrate-and-fire spiking motoneuron driven by the phasically coupled neurons.

19. (Original) The central pattern generator-based system of claim 1, including at least one muscle.

20. (Original) The central pattern generator-based system of claim 1, wherein the system is a robot.

21. (Original) The central pattern generator-based system of claim 7, wherein the system includes a central pattern generator chip and at least one biological neuron.

22. (Original) The central pattern generator-based system of claim 21, including multiple chips.

23. (Original) The central pattern generator-based system of claim 1, including at least one sensor for collecting sensory feedback.

24. (Original) The central pattern generator system of claim 23, including a system for phase adjustment of the central pattern generator based on at least one sensory trigger in the received sensory feedback.

25. (Original) The central pattern generator-based system of Claim 1, wherein the sensory feedback is received from the at least one mechanical limb.

26. (Original) The central pattern generator-based system of Claim 1, wherein the sensory feedback is received from a sensing modality.

27. (Currently Amended) A central pattern generator-based system for controlling a biological system for rhythmic movement, comprising

an interface with a biological system that can provide sensory feedback from said biological system; and

a non-biological central pattern generator that autonomously generates commands for controlling the biological system wherein commands are adapted as a function of sensory feedback.

28. (Original) The central pattern generator-based system of claim 27, including a system for phase adjustment of the central pattern generator based on a sensory trigger in or derived from sensory feedback.

29. (Original) The central pattern generator-based system of claim 27, including:

a system for phase adjustment of the central pattern generator based on at least one sensory trigger in or derived from sensory feedback; and

a system for controlling firing frequency of motoneurons as a function of the sensory feedback or the sensory trigger.

30. (Original) The central pattern generator-based system of claim 27, further including at least one memory device.

31. (Original) The central pattern generator-based system of claim 30, wherein the memory device controls adaptation of output from the central pattern generator.

32. (Original) The central pattern generator-based system of claim 31, wherein the output includes integrate-and-fire neurons.

33. (Original) The central pattern generator-based system of claim 27, wherein the system is at least one chip.

34. (Original) The central pattern generator-based system of claim 33, including at least one chip containing electronic analogues of biological neurons, synapses and time-constraints.

35. (Original) The central pattern generator-based system of claim 33, including at least one chip that includes dynamic memories and phase modulators.

36. (Original) The central pattern generator-based system of claim 27, wherein the system is a non-linear oscillator including electronic analogues of biological neurons, synapses and time-constraints, dynamic memories and phase modulators.

37. (Original) The central pattern generator-based system of claim 33, wherein the system includes at least one chip in which components are integrated with hardwired or programmable circuits.

38. (Original) The central pattern generator-based system of claim 27, wherein the central pattern generator is a distributed system of at least two non-linear oscillators.

39. (Original) The central pattern generator-based system of claim 38, wherein the distributed system includes at least one neuron phasically coupled to a neuron or a sensory input.

40. (Original) The central pattern generator-based system of claim 38, wherein the distributed system includes at least two neurons phasically coupled to each other, to another neuron, or to a sensory input.

41. (Original) The central pattern generator-based system of claim 40, wherein phasic coupling is in-phase, 180 degrees out of phase, or any number of degrees out of phase.

42. (Original) The central pattern generator-based system of claim 40, wherein phasic coupling is based on rhythmic movement application.

43. (Original) The central pattern generator-based system of claim 40, including a phase control circuit.

44. (Original) The central pattern generator-based system of claim 40, including at least one integrate-and-fire spiking motoneuron driven by the phasically coupled neurons.

45. (Original) The central pattern generator-based system of claim 27, including at least one muscle.

46. (Original) The central pattern generator-based system of claim 33, wherein the system includes a central pattern generator chip and at least one biological neuron.

47. (Original) The central pattern generator-based system of claim 46, including multiple chips.

48. (Original) The central pattern generator-based system of claim 27, including at least one sensor for collecting sensory feedback.

49. (Original) The central pattern generator system of claim 48, including a system for phase adjustment of the central pattern generator based on at least one sensory trigger in the received sensory feedback.

50. (Original) The central pattern generator-based system of Claim 27, wherein the sensory feedback is received from the at least one biological limb.

51. (Original) The central pattern generator-based system of Claim 27, wherein the sensory feedback is received from a sensing modality.

52. (Original) A method for controlling a mechanical or biological system for rhythmic movement, comprising:

(A) measuring sensory feedback to obtain measured sensory feedback;

(B) processing the measured sensory feedback to obtain data for a plurality of designated parameters; and

(C) via a central pattern generator-based

system, applying a set of rules to the obtained data to generate at least one signal for commanding the limb or biological system for rhythmic movement, wherein the central pattern generator-based system comprises a circuit that mimics a biological central pattern generator.

53. (Original) The method of claim 52, including (D) via the central pattern generator-based system, applying the generated signal to command the limb or biological system for rhythmic movement.

54. (Original) The method of Claim 52, wherein the central pattern generator system comprises a circuit comprising at least two coupled non-linear oscillators.

55. (Currently Amended) A robotics system comprising:

(a) a central pattern generator-based system that mimics a biological central pattern generator to autonomously generate commands; and

(b) at least one sensory device providing signals for adaptation of said commands.

56. (Original) The robotics system of claim 55, wherein the central pattern generator-based system receives sensory input from the at least one sensory device.

57. (Currently Amended) An autonomous movement device for providing rhythmic control, wherein the autonomous device comprises:

a non-biological central pattern generator that generates rhythmic control commands wherein commands are adapted as a function of sensory feedback.

58. (Original) The autonomous movement device of claim 57, including at least one mechanical limb.

59. (Original) The autonomous device of claim 58 wherein the limb is a leg, arm, wing or appendage for swimming.

60. (Original) The movement device of claim 58 including at least two limbs.

61. (Original) The movement device of claim 57, wherein the device is a breathing controller.

62. (Original) The movement device of claim 57, wherein the device is a pacemaker.

63. (Original) The movement device of claim 57, wherein the device is a running device.

64. (Currently Amended) A non-biological central pattern generator comprising:

a memory device; and

a system for manipulating neural phasic relationships <u>of autonomously generated output signals</u>.

65. (Original) A method for modifying a continuous waveform provided by a non-biological central pattern generator, comprising the steps of:

(A) provision of a continuous waveform by a non-biological central pattern generator;

(B) provision of sensory feedback to the non-biological central pattern generator;

(C) rule-application by the non-biological central pattern generator to the sensory feedback;

(D) based on the rule-application, determination by the non-biological central pattern generator to modify or maintain the continuous wave form.

66. (Original) The method of claim 65, wherein the non-biological central pattern generator modifies the wave form.

67. (Original) The method of claim 65, wherein the rule-application is the application of adaptive ring rules.